

Eastern and Western Mindfulness: Investigating a potential  
mediating role of self-regulation

by:

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## Abstract

The present study examined the hypothesis that self-regulation of attention would be the core mechanism that ties together two dominant conceptualizations of mindfulness: (1) an eastern style more associated with influential figures such as Dr. Jon Kabat-Zinn, and (2) a western style pioneered by Dr. Ellen Langer. Dispositional mindfulness (defined as a trait rather than a momentary state of being) of eastern and western styles as well as self-regulation were measured using self-reported questionnaires: FFMQ, LMS and SRS. A large sample of participants (N=208), mostly female university non-meditator students, completed the respective scales online. Self-regulation of attention was correlated with both kinds of dispositional mindfulness. A partial mediation effect of self-regulation of attention on eastern and western mindfulness mode was revealed using the regression-based methods described by Baron and Kenny (1986) and the Sobel-Goodman analyses. Implications and areas of future research are discussed.

*Keywords:* Mindfulness, Eastern Mindfulness, Western Mindfulness, Kabat-Zinn, Langer, Meditation, Mediation Analysis, Baron And Kenny, FFMQ, LMS, SRS, Self-Regulation Of Attention

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## **Introduction**

In the last 30 years, interest in mindfulness has increased exponentially both in academic research and clinical contexts (Brown, Cresswell & Ryan, 2015; Bishop, 2004; Malinowski, 2013). There is a growing application of mindfulness techniques and principles by practitioners within both clinical and nonclinical settings (Baer, 2003; Brown, Creswell, & Ryan, 2015; Hart, Ivztan, & Hart, 2013; Kabat-Zinn, 2003; Shapiro, Carlson, Astin, & Freedman, 2006). Mindfulness has been linked with a simultaneous positive increase in physical and psychological well-being including happiness, emotional regulation, neuroendocrine function and attentional control. Mindfulness has also been shown to reduce negative maladaptive cognition (Baer, 2003; Brown et al., 2015; Brown & Ryan, 2003; Didonna, 2009; Hart et al., 2013; Holzel et al., 2011; Kabat-Zinn, 2003; Keng, Smoski, & Robins, 2011; Langer & Moldoveanu, 2000; Malinowski, 2013; Moore, Gruber, Deroose, & Malinowski, 2012; Ostafin, Robinson, & Meier, 2015; Shapiro et al., 2006).

Despite the tremendous amount of research on mindfulness, there is still relatively little agreement about its definition and conceptualization. Some of the differences are well captured by the schools of thought led by Dr. Jon Kabat-Zinn and Dr. Ellen Langer. Kabat-Zinn defines mindfulness as “paying attention in a particular way; on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 1994, p. 4). Dr. Ellen Langer defines mindfulness as being actively engaged in the present and noticing novelty. The two views lead to distinct types of mindfulness practices. Being mindful according to



Kabat-Zinn's view is primarily promoted by the practice of meditation. According to Dr. Ellen Langer's view, the state of mindfulness is an orientation to being attentive no matter the context. So, these two schools seem at first glance very different from one each other.

A recent paper comparing those two views of mindfulness has come to the conclusion that despite their differences, they may rest on a common mechanism – self-regulation of attention. Comparing their definitions, their tools to measure dispositional mindfulness and their clinical interventions, Hart, Ivtzi and Hart (2013) suggested that Kabat-Zinn and Langer's views of mindfulness would both have self-regulation of attention as a common mediating mechanism. Self-regulation is defined as contextual adaptation of the self based on some kind of standard such as a goal, an ideal, or a belief, and refers to thoughts, feelings, and behavior (Ostafin, Robinson, & Meier, 2015). A seminal definition includes the following:

Self-regulation refers to those processes, internal and/or transactional, that enable an individual to guide his/her goal-directed activities over time and across changing circumstances (contexts). Regulation implies modulation of thought, affect, behavior, or attention via deliberate or automated use of specific mechanisms and supportive metaskills (Karlovy, 1993, p. 25).

So, essentially self-regulation of attention is attentional control when a person concentrates on their task consistently and controls the influence of distractions.

This paper will begin with an overview of western and eastern mindfulness, specifically their respective definitions, measurement scales and practical applications in

research. Each of these subsections will address the importance of self-regulation of attention in both styles of mindfulness. For the sake of clarity and brevity, this paper will follow the relatively simplistic dichotomy used by Hart et al. (2013) and refer to the meditative (i.e. Kabat-Zinn) conception as “eastern mindfulness” while Langerian mindfulness will be referred to as “western mindfulness”. Also, it is important to note that mindfulness as a term has been used to describe four distinct but interrelated things: (a) a state of being, (b) a trait, (c) a form of practice, and (d) a type of therapeutic intervention (Hanley & Garland, 2017). Broadly speaking, a *state* of mindfulness can be entered through *practices* and *clinical interventions* that embody principles of mindfulness like non-judgmental awareness, consequently cultivating a *trait* or temperamental disposition. Furthermore, Kabat-Zinn describes mindfulness as both a concept and practice, simultaneously the intent, methodology and results (Kabat-Zinn, 2003).

### **Definitions and Characteristics**

#### **Western Mindfulness**

Dr. Ellen Langer and her colleagues developed their concept of western mindfulness during the 1970s at Harvard University, borrowing eastern concepts; this brought mindfulness outside of purely meditative practices. Her conceptualization of mindfulness focuses on external stimuli and emphasizes being mindful of the novelty in information, the context in which it is embedded and the multitude of perspectives inherent to every situation. People are encouraged to develop cognitive flexibility and

curiosity to each situation they encounter, thereby increasing their engagement and consequently their awareness (Langer & Moldoveanu, 2000; Weick & Putnam, 2006).

Dr. Ellen Langer's conception encourages us to adopt several perspectives to stimulate mindful awareness and expand our thinking beyond conventional cognitive processing. One analogy that illustrates her point of view comes from the legendary psychiatrist Dr. Viktor Frankl who stated that people are like complex shapes (for example a cone) and need to be seen from various angles to fully encapsulate who and what they are. Looked at from one angle, in a dark room – a cone could be erroneously inferred to be a simpler shape altogether (Marshall & Marshall, 2012). Another example given by Dr. Ellen Langer is the multitude of perspectives presented in a piece of literary work like a novel; each character is nested within a larger framework of intersecting perspectives that have an influence on other characters in the play (Kidd & Castano, 2013; Langer, 2000).

In addition, Dr. Ellen Langer distinguishes her concept of mindfulness against mindlessness, defined as premature cognitive commitments seen during “auto-pilot” thinking, which are often unquestioned and blind to alternative perspectives. In Dr. Ellen Langer's own words:

Mindfulness is a flexible state of mind in which we are actively engaged in the present, noticing new things and sensitive to context. When we are in a state of mindlessness, we act like automatons who have been programmed to act according to the sense our behavior made in the past, rather than the present. Instead of actively drawing new distinctions, noticing new things, as we do when

we are mindful, when we are mindless we rely on distinctions drawn in the past. We are stuck in a single, rigid perspective, and we are oblivious to alternative ways of knowing. When we are mindless, our behavior is rule and routine governed; when we are mindful, rules and routines may guide our behavior rather than predetermined it (Langer, 2000, p.1).

Another definition gives a broader perspective of Dr. Ellen Langer's concept:

Mindfulness is not an easy concept to define but can be best understood as the ... It does not matter whether what is noticed is important or trivial, as long as it is new to the viewer. Actively drawing these distinctions keeps us situated in the present. It also makes us more aware of the context and perspective of our actions than if we rely upon distinctions and categories drawn in the past. Under this latter situation, rules and routines are more likely to govern our behavior, irrespective of the current circumstances, and this can be construed as mindless behavior. The process of drawing novel distinctions can lead to a number of diverse consequences, including (1) a greater sensitivity to one's environment, (2) more openness to new information, (3) the creation of new categories for structuring perception, and (4) enhanced awareness of multiple perspectives in problem solving. The subjective "feel" of mindfulness is that of a heightened state of involvement and wakefulness or being in the present. This subjective state is the inherent common thread that ties together the extremely diverse observable consequences for the viewer. Mindfulness is not a cold cognitive process. When

one is actively drawing novel distinctions, the whole individual is involved (Langer & Moldoveanu, 2000, p. 1).

Langerian mindfulness involves a perceived control of reality by becoming aware of several possible perspectives and fluidly shifting between them, much like an actor's ability to keep several of the character's lines in context to his or her own lines during the reading of a play. This fluidity gives meaning to outcomes and highlights novelty in context to help sustain attention and improve memory (Langer, 1997). While she does not deter people from meditative practices or see the two as mutually exclusive, she does see her concept of mindfulness as independent and applicable to everyday situations, requiring very little training, if at all. In fact, many of her studies highlight what she calls the "psychology of possibility" in that a simple alteration of instruction can produce real changes in mindset, behavior, health and performance – much the same way a placebo does (Ie, Ngnoumen, & Langer, 2014).

In her model, Dr. Ellen Langer does not explicitly state self-regulation of attention as a central mechanism but appears to suggest its importance by emphasizing novelty and drawing distinction as core features of western mindfulness (i.e. the seeking novelty subscale on the LMS). Furthermore, according to Vohs et al. (2008), Dr. Ellen Langer seems to define self-regulation of attention as exerting self-control to supersede mindless responses by focusing one's awareness on external stimuli in a novel way. Attentional control increases cognitive and behavioral regulation while reducing impulsivity to create meaningful interaction with the environment. Through practice, this eventually becomes part of a person's disposition (Carson & Langer, 2006; Langer & Moldoveanu, 2000).

Additionally, Hart et al. (2013) point to a theory of two information-processing systems that correlate with mindful and mindless modes of operation, to explain the importance of self-regulatory behavior in Dr. Ellen Langer's model. It states that two modes, S1 and S2, are responsible for distinct and separate modes of information processing that operate concurrently. S1 is the conventional autopilot mode that characterizes mindlessness and quick bursts of processing (which is assumed to be the *modus operandi* of typical human functioning by most models of mindfulness) while S2 is a more mindful, methodical and deliberate mode of processing information which is trained through brief interventions that target regulation of attention like those seen in Dr. Ellen Langer's studies (Kahneman, 2011). According to Burpee and Dr. Ellen Langer (2005) and Masicampo and Baumeister (2007), given that Dr. Ellen Langer's model seems to enhance trait mindfulness, and self-regulation and mindfulness are correlated, it would stand to reason that Dr. Ellen Langer's brief interventions practiced regularly involve a strengthening of attentional control central to self-regulation. A closer look at Langerian Mindfulness reveals a regulation of attention to novel aspects in a person's experience and novelty, by default, is a conscious control of attention. This is directly contrasted with automatic unconscious cognitive processes.

### **Eastern Mindfulness**

The embryonic roots of mindfulness rests in eastern philosophies and practices, with western adaptation influenced by Buddhist scriptures which hold that desire is the nucleus of all human suffering (Hanh, 1998). The word mindfulness originally comes from the Pali word *sati*, which means having awareness, attention, and remembering

(Bodhi, 2000, Davis & Hayes, 2011). The modern concept of eastern mindfulness emphasizes, among other things, “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally . . . it is an appreciation for the present moment and the cultivation of an intimate relationship with it through a continual attending to it with care and discernment.” (Kabat-Zinn, 1994, (pp. 8–9)). The majority of the academic literature regarding mindfulness refers to this definition proposed by Dr. Jon Kabat-Zinn. Subsequent authors presented definitions which deviate little from this general conceptualization; typically extending it to include other related facets or prescribing preferential attention to related mechanisms they view as central to the construct of mindfulness. Shapiro (2006) conceptualizes mindfulness as: 1) attention, the process of observing internal and external stimuli; 2) intention, which is essentially the reason behind engaging in practices meant to cultivate mindfulness; and 3) attitude which describes the quality of perception an individual brings to mindfulness practices. Bishop et al. (2004) defines mindfulness through a two-pronged operational definition stating, “the first component involves the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment. The second component involves adopting a particular orientation toward one’s experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance.” Other definitions include “characterized by dispassionate, non-evaluative, and sustained moment-to-moment awareness of perceptible mental states and processes. This includes continuous, immediate awareness of physical sensations, perceptions, affective states, thoughts, and imagery” (Grossman et al., 2004) and as “a

receptive attention to and awareness of present events and experience” (Brown et al., 2007). Mindfulness can also be defined as “moment-by-moment awareness” (Germer et al., 2005, p. 6) or as “a state of psychological freedom that occurs when attention remains quiet and limber, without attachment to any particular point of view” (Martin, 1997, p. 291). Amidst the lack of universal agreement on definition and the conceptual confusion in the literature, traditional exercises promoting mindfulness such as watching the breath are practiced widely by those interested in mindfulness.

Different forms of practice thought to induce aspects of mindfulness include diverse forms of yoga, prayer, Zen Buddhism, tai chi, qigong, and the generically termed mindfulness meditation (Hanley, Abell, Osborn, Roehrig, & Canto, 2016). Most meditative practices involve similar aspects such as sitting quietly and observing a physical sensation, usually the breath or aspects of the body, in a nonjudgmental and nonreactive way that cultivates what is conceptualized as ‘mindfulness’ (Brown et al., 2015). Wandering attention is dealt with by bringing awareness back to the breath and strengthening that skill of self-regulating attention in the hopes that it will be used in situations that are stressful or anxiety provoking (Bishop, Lau, Shapiro, Carlson, Anderson, Carmody, Segal, Abbey, Specca, Velting, & Devins, 2004).

The vast research on eastern mindfulness suggests that self-regulation of attention is a central mechanism by which mindfulness exerts its effects, namely by allowing more allocation of resources and consequently a more efficient chain of information processing (Holzel et al., 2011; Lutz, Slagter, Dunne, & Davidson, 2008; Malinowski, 2013; Shapiro et al., 2006; Tang et al., 2007). Mindfulness meditation involves regulating your attention



and noticing the shifts in experience (Siegel, Germer, & Olendzki, 2009). While self-regulation of attention is not unique to mindfulness and can be trained through various measures such as complex puzzles and games; meditative practices are considered one of the best ways to practice attentional control (Murru & Martin Ginis, 2010; Ostafin et al., 2015). Thus, the unique identity of mindfulness lies in the regulation of the self in relation to external and internal stimuli. Some scholars even expressly define mindfulness as a self-regulation of attention, among other facets such as orienting towards the present with open curiosity and acceptance (Bishop, 2004).

There are a variety of models that attempt to outline the theoretical framework of mindfulness and its key mechanisms, with the majority viewing attentional regulation as the common denominator. Bishop et al. (2004) proposes a bipartite model of mindfulness which focuses on the regulation of attention to experience in the present moment supplemented with an open, curious and accepting stance toward that experience. This is proposed to lead to a decentering of the mind, otherwise known as a dispassionate and healthy distance from one's cognitions and emotions. An alternate 3-pronged model of mindfulness was proposed by Shapiro et al. (2006) emphasizing attitude, attention and intention, all leading to the decentering process previously described. Attention seems to be the catalyst for this all-important decentering process in breaking the chain of maladaptive thought. Kang et al. (2012) emphasizes attention regulation as a central facet of mindfulness as well, coupled with awareness, present-moment focus, and non-judgmental acceptance of experience. Holas and Jankowski (2013) see attention regulation as the predecessor to enhanced metacognition and subsequently, a decentering

from automatic negative thoughts and emotions. The common denominator of these models of mindfulness view attentional regulation as a primary facilitator of mindfulness and its beneficial psychological effects such as decentering and diminished emotional reactivity.

The involvement of attention in “eastern” mindfulness has been empirically supported in many ways. Eastern mindfulness has been shown to be positively correlated with self-regulation and attentional control with various studies highlighting the foundational nature of regulating one’s attention to meditative practices (Burg & Wolf, 2012; Davis-Siegel, Gottman, & Siegel, 2015; Hart et al., 2013; Malinowski, 2013). Meditative practices are thought to enhance self-regulation abilities by training people within a reflective space, to be more dispassionate and adaptable in their responses as opposed to reacting automatically (Brown, Ryan, & Creswell, 2007).

The attention network and its efficacy as measured by speed is considered most relevant to self-regulation and mindfulness (Ostafin et al., 2015). A number of behavioral studies suggest that mindfulness training could improve some component of attention (Jha, Krompinger et Baime, 2007, Tang et al. 2007). These authors use a classical attentional task, the Attention Network Task (ANT), designed to measure three different networks of attention outlined by Posner and Peterson (1990): the sustained attention, switching attention and executive attention. The test involves the participant pressing one key indicating directionality (left or right pointing) of a central arrow with surrounding stimuli acting as congruent or incongruent flankers that facilitate conflict monitoring. Cues presented before these flankers indicate subsequent direction of flankers relative to

the central arrow. The cues reflect activation of the alerting and orientation networks while the flankers facilitate conflict resolution. Three scores are given to the participant that reflect relative network efficiency with regards to alerting, orienting and executive attention. Jha et al. (2007) had a group of novices trained in MBSR for 8 weeks and another group of experts with experience in concentrative meditative technique that went on a meditation retreat. Performance on ANT was compared before and after training and compared with a control group that did not receive any meditation training. Compared to the control group, both experimental groups showed significantly improved scores on some of the attentional measures after training, suggesting that mindfulness training could enhance functioning of some components of attention. Tang et al. (2007) found similar results using a training protocol consisting of five days of Integrated Body-Mind Training (IBMT), a form of meditative mindfulness with eastern roots, for 30 minutes per day.

The involvement of attention in “eastern” mindfulness has also been supported in physiological and imaging studies as well. In a study by Tang, Lu, Feng, Tang, & Posner (2015), the practice of IBMT under the same protocol of Tang et al. (2007) described above, resulted in increased blood flow to the left ACC, insula, and medial prefrontal cortex (MPC) which are known to be crucial in self-regulation and attentional control. In addition, it was found that 11 hours of IBMT practice reduced fractional anisotropy, an index of white matter integrity and efficiency connecting areas of the ACC to other parts of the brain, further highlighting the evidence supporting not only mindfulness and self-regulation but the benefits of even short-term practice (Tang et al., 2010). These

activation patterns have been seen in previous mindfulness studies investigating the neural correlates of the ANT using fMRI (Fan, Mccandliss, Fossella, Flombaum, & Posner, 2005) and replicated in studies assessing the subsystems of attention and mindfulness training (Jha, Krompinger, & Baime, 2007).

Further evidence for this connection between self-regulation of attention and mindfulness comes from one study which examined participants before, during and after a Stroop task while recording their event-related potentials (ERP) and the results showed that even brief 10 minute, daily bouts of mindfulness meditation resulted in higher indexed N2 signals, suggesting more focused attentional resources, and reduced P3 signals which indicates more efficient perceptual processing and conflict resolution capabilities (Moore et al., 2012); all these are foundational components of the attention network.

Comparing the two models of mindfulness, it is clear that there are similarities in how they define their respective constructs which seems plausible given that Dr. Ellen Langer's model seems to be a focus on a subset of the more prominent, eastern influenced model of mindfulness. In addition, self-regulation of attention seems to be central to both styles in order to induce mindful modes of cognition (Hart et al., 2013). For example, eastern mindfulness emphasizes regulating one's attention to the breath. Western mindfulness emphasizes paying attention to novelty while interacting with the external world. Both require regulating attention while shifting away from mindless automatic perception and towards an effortful, deliberate interaction with the internal (eastern) and external (western) world. However, there is also reason to view these two

constructs of mindfulness as separate. The focus on meditative practices and physiological sensations in eastern mindfulness contrasts with Langerian mindfulness which seems to focus on pure cognitive states with a focus on creative interaction with external stimuli. The constructs typically used to measure these styles of mindfulness seem to corroborate both of these initial observations with regards to the definitions of eastern and western mindfulness.

### **Tools and Scales**

Hart et al. (2013) propose that self-regulation of attention is involved in both eastern and western mindfulness. They argue one way to ascertain this is by looking more closely at the respective scales and their relations to self-regulation of attention. The following scales were suggested by Hart et al. (2013) in their summary paper as exemplar tools to measure eastern mindfulness, western mindfulness, and self-regulation of attention: (1) The Five Facet Mindfulness Questionnaire (FFMQ), and (2) the Langer Mindfulness Scale (LMS). The FFMQ was described as a broad conceptualization of eastern mindfulness which has been employed in many studies. The LMS is the only scale available to capture Western Mindfulness and the Self-Regulation Scale (SRS) was suggested as an adequate measure of self-regulation due to its focus on attentional control (as opposed to other scales such as the Self-Control Scale which measures self-regulation as a general construct).

## **FFMQ**

The Five Facet Mindfulness Questionnaire (FFMQ), reflects mainly from the ‘eastern’ mindfulness school of thought, is a 39 items questionnaire pooling items from previously used scales such as the Freiburg Mindfulness Inventory (FMI), the Mindful Attention Awareness Scale (MAAS), the Kentucky Inventory of Mindfulness Skills (KIMS), the Cognitive and Affective Mindfulness Scale (CAMS), and the Mindfulness Questionnaire (MQ) (Hart et al., 2013). It was designed to assess what are thought to be the five key mechanisms supporting mindfulness as conceptualized from an eastern context, specifically observing (noticing internal and external stimuli), describing (ability to assign verbal labels to experiences), acting with awareness (paying attention to the present moment), nonjudging of inner experience (inhibit evaluation of thoughts and emotions), and nonreactivity to inner experience (ability to allow stream of consciousness to flow freely without restraint or evaluation) (Baer et al., 2008). Sample items include, “I am good at finding words to describe my feelings”; “I find myself doing things without paying attention”; “I think some of my emotions are bad or inappropriate and I should not feel them”; “I perceive my feelings and emotions without having to react to them.” (Baer et al., 2008).

The FFMQ is an aggregate of previously constructed scales assessing eastern influenced mindfulness. The FFMQ was originally developed based on the model of Dialectical Behavior Therapy (DBT) (Linehan, 1993). While the KIMS was also heavily influenced by DBT, the MAAS was constructed based on the authors knowledge and practice of mindfulness combined with the scales and literature on mindfulness at the

time emphasizing attention and awareness of everyday experience and excluded unrelated factors such as attitude or intent as well as the results of mindfulness practice (Brown & Ryan, 2003; Ostafin, Robinson, & Meier, 2015). The FMI and its conceptual origin was borrowed from Buddhist concepts of mindfulness, specifically insight meditation and derived from various publications pertaining to mindfulness, from academic journals to readings emphasized by well-known meditation centers and writings from various authorities on Buddhist models of mindfulness (Buchheld, Grossman & Wallach, 2001). Conversely, the CAMS were designed to encapsulate a wide conceptualization of mindfulness regardless of training or theoretical specialty. The scale's items were compiled from various theoretical and clinical writings on mindfulness. They were selected to reflect attitudes towards an internal experience of thoughts and emotions, ignoring items which would assess experience of physical sensations (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). The MQ was originally developed to assess a person's association with their distressing thoughts and influenced by the relevance to clinical practice of understanding such a relationship with those thoughts. The scale was conceptualized along four different dimensions assessing decentering awareness, sustained attentional capacity, non-judgmental acceptance, and non-reactance to emotional distress (Chadwick et al., 2008).

Due to the reliability and validity, the five facets of the FFMQ were found to be a good fit for the concept of mindfulness (Christopher, Neuser, Michael, & Baitmangalkar, 2012). Alpha coefficients of the scale ranged from .72 to .92, yielding a good internal constancy (Baer et al., 2008). Convergent validity with other eastern mindfulness scales

varies greatly depending on the scale, for example the Southampton Mindfulness Questionnaire (Chadwick et al., 2008) versus the Kentucky Inventory of Mindfulness Skills scale (Baer et al., 2004). Overall, a study examining the convergent validity of the FFMQ with 4 other mindfulness scales yielded correlations of 0.25 – 0.90 in a first sample and 0.36 – 0.95 in a second sample (Siegling & Petrides, 2014). A second study in 2016 found similar results (Andrei, Vesely, & Siegling, 2016). This is thought to reflect the individual differences in scales, such as momentary awareness vs. a global composition of mindfulness and its facets.

The FFMQ has been used in many studies to assess Eastern mindfulness and has been validated in both meditating and non-meditating samples (Lilja, Lundh, Josefsson, & Falkenström, 2013) with experience being correlated with higher scores. Additionally, the FFMQ has been validated in cross cultural applications in French (Heeren, Douilliez, Peschard, Debrauwere, & Philippot, 2011), Australian (Taylor & Milllear, 2016), Spanish (Cebolla et al., 2012), Dutch (de Bruin et al., 2012), Chinese (Hou, Wong, Lo, Mak, & Ma, 2014), and Italian (Giovannini et al., 2014) samples.

Changes in the FFMQ has been found to have a positive correlation with self-regulation of attention pre- and post-MBSR (Carmody, Baer, Lykins, & Olendzki, 2009), and has items that are similar in nature to that of the self-regulation scale (Diehl, Semegon, & Schwarzer, 2006) which corresponds to eastern conceptualizations of mindfulness as having integral ties with regulation of the self (Hart et al., 2013). The link between self-control (a conscious form of self-regulation) and mindfulness has also been supported in a study using students that are mostly non-meditators. Bowlin and Baer were



interested in dispositional mindfulness, the natural tendency to be mindful in daily life. They had 280 undergraduate students complete self-report measures on mindfulness and self-control, specifically the FFMQ and the Self-Control Scale (SCS), along with other scales measuring well-being. The results of this study show a correlation between this scale and the subscales of the FFMQ that was respectively -.06 for Observing, .31 for Describing, .55 for Acting with Awareness, .38 for Non-judging of inner experience and .40 for Non-reacting to inner experience. The study by Bowling and Baer was the first study to present a significant correlation between self-control and dispositional mindfulness.

### **LMS**

The Langer Mindfulness Scale (LMS) (Langer, 2004) consists of 21 items and was designed to operationally define Langerian Mindfulness as a construct. It is comprised of 4 subscales: Novelty seeking, Engagement, Novelty producing, and Flexibility. Sample items include “I am always open to new ways of doing things.”; “I can behave in many different ways for a given situation.”; “I find it easy to create new and effective ideas.” Reliability of the questionnaire ranges from coefficient alphas of .65 to .9 for individual constructs. The LMS was found to correlate with the adoption of multiple perspective, openness to new experiences and creative thinking. In addition, through various studies, the scale was found to correlate with levels of trait mindfulness (Burpee & Langer, 2005; Djikic, Langer, & Stapleton, 2008). In addition, Pirson, Langer, Bodner et Zilcha (2012) found that the LMS was correlated with psychological well-being, satisfaction with life, self-esteem, positive relationships, positive emotions, humor,

creativity, engagement at work, and health. Conversely, they found the LMS to have a negative relationship with a dependence on structure, neuroticism, negative emotions, depression, and pain.

No analyses or observation of the LMS and self-regulation of attention have been conducted but an examination reveals that the questions on the LMS may indirectly address attentional control by the subscales focusing on novelty and flexibility (Hart, Ivztan, & Hart, 2013). Conversely, the LMS and the SRS (described below) measure openness and attention which are unique constructs and do not necessarily overlap without significant difference in concept.

When comparing the two scales, the FFMQ is seen as more broad and wide-ranging than the LMS with Dr. Ellen Langer's scale focusing on the openness dimension comprising the Observing and Acting with Awareness subscales of the FFMQ. This provides further evidence for the theory that Langerian mindfulness represents a substructure of eastern mindfulness (Hart et al., 2013; Pirson et al, 2012). The initial development and validation of the LMS included measuring its correlation with the FFMQ. The resulting correlation was .37 ( $p < .01$ ) with the sub-constructs of novelty producing and engagement moderately correlated with the FFQM total score (0.33 and 0.32 respectively), while Novelty Producing was also significantly correlated with the Describe Subscale of the FFMQ (0.29) and the Engagement subscale with Describe (0.34) and Non-judgment (0.26) of the FFMQ (Pirson, Langer, Bodner, & Zilcha, 2012).

More recent studies have examined the FFMQ and the LMS, and consistently they found that the LMS has moderate to weak correlations with scales measuring eastern

mindfulness like the FFMQ and others, with correlations ranging from 0.00 - 0.39. (Andrei, Vesely, & Siegling, 2016; Siegling & Petrides, 2014; 2016). The authors suggest this reflects the highly divergent nature of Dr. Ellen Langer's concept of mindfulness and offer support for the construct being separate and distinct from the traditional eastern style of mindfulness (Siegling & Petrides, 2014; 2016). Hart et al., (2013) did suggest that they are distinct but that they share commonality, specifically self-regulation of attention, which was not assessed in the previously described studies. This point will be taken up in the discussion.

## **SRS**

Mindfulness has been studied with general measures of self-regulation like the self-control scale (SCS) and within the context of performance on attentional control tests such as the ANT. However, there is a lack of studies examining the relationship between dispositional mindfulness and self-regulation of attention as a trait specifically. The Self-Regulation Scale (SRS) is another scale that focuses on attentional control specifically and is cited as a suitable candidate for measuring such a construct by Hart et al. (2013). The SRS is a 10-item questionnaire designed to measure self-regulation capabilities; specifically, self-regulation of attention in the pursuit of a goal which provides a specific way to measure attentional control and examine its relationship to mindfulness beyond general self-regulation. It is important to look at self-regulation of attention outside of emotional regulation, behavioral regulation and other forms of regulation because attentional control is seen as a central mechanism in many prominent models of mindfulness and could provide key information regarding its mechanisms (Bishop, 2004;

Kabat-Zinn, 1994). In the present study, the SRS was used in mediation analyses along with the FFMQ and the LMS (see methods section). The coefficient of internal consistency (Cronbach's  $\alpha$ ) in the SRS was .76. The SRS has been shown to correlate positively with self-efficacy and proactive coping while having a negative relationship with depressive symptoms and negative affect, both of which have been shown to be problematic in terms of focusing on a given task (Diehl, Semegon, & Schwarzer, 2006). These correlations seemed stable across age groups suggesting its widespread applicability across the adult life span. Interestingly, self-regulation of attention was also significantly correlated to a person's commitment to the goal they are pursuing (Diehl, Semegon, & Schwarzer, 2006). The SRS homes in on a specific aspect of that construct, namely attentional control.

### **Clinical Interventions**

Hart et al. (2013) contention that self-regulation of attention is the common mechanism between eastern and western mindfulness was concluded after a thorough comparison of both streams of research, including the clinical interventions employed by both styles. These interventions are the catalyst by which people experience change as a result of the underlying theoretical constructs and provide a visible means of ascertaining change as a result of practicing both styles of mindfulness. The following section will describe both eastern and western mindfulness interventions and how self-regulation of attention might be involved as a mechanism in both kinds of interventions.

### **Western Mindfulness Interventions**

Effective applications of Langerian Mindfulness are contrasted with its antithesis: mindlessness. There are two conventional paths to mindlessness which are repetition and single exposure. The former being associated with unconscious processes and the latter lacking a meaningful interaction with whatever stimulus with which the person is interacting. Mindfulness, as Dr. Ellen Langer sees it, requires a continual awareness of novelty; a stream of conscious reflection on the unique aspects of stimuli with which we interact (Langer, 2000). This is highlighted in an example Dr. Ellen Langer gives of a game invented by her and colleagues called ‘smack-it ball’ which involves participants wearing a glove shaped like a racket. Those who played the game after receiving conditional instruction (this is how you *could* play the game) meant to induce states of mindfulness were judged as having better performance, employed more novel strategies and enjoyed the game more compared to those who received more absolute instructions (this *is* how you play the game) (Langer, 2000).

The western mindfulness approach is typically utilized with non-clinical populations (although not exclusively) applying brief, instructional style interventions that are designed to induce states of mindfulness (Haller, 2015). Dr. Ellen Langer and colleagues contend that these instructional interventions encourage participants to intentionally shift their mindset from mindless and automatic to mindful and engaged by interrupting habitual routines of thinking. Repeated development of this heightened state of mindfulness can lead to a improved dispositional trait (Burpee & Langer, 2005; Langer & Moldoveanu, 2000). It has also been advocated as a pillar in revamping the education

system due to the notion that the very way attention is predicated within academia is actually conducive to mindlessness; in other words, by paying attention to only the fixed, stable aspects of stimuli, the various possibilities are often overlooked and support shallow, narrow perspectives (Langer, 1997). Over 150 papers and four books have been published on Dr. Ellen Langer's work in a variety of contexts to showcase the variety of situations which can benefit from mindfulness without meditation.

One example of the effect of a simple alteration is the famous math performance study where Dr. Ellen Langer and colleagues gave students math problems which could be solved in several diverse ways. The control group were given absolute instructions and told of one way to solve the problem. The experimental group was given conditional instructions (ex. "This is one way of solving the problem...here are several others") which highlighted different viable solutions to the problem. It was found that the control group exhibited the typical gender difference, in which males outperform females on math tasks. However, this disappeared under the conditional instructions meant to induce brief states of mindfulness (Anglin, Pirson, & Langer, 2008).

In another set of novel studies examining visual acuity, Dr. Ellen Langer and her colleagues could show that perceived physiological limitations could be overcome through alterations of mindset. One study had participants embody the role of a pilot with the stereotype that they have great vision. This was achieved by having participants wear the uniform and fly realistic flight simulators. They were compared to a control group who merely simulated flying in the machine. The experimental condition participants demonstrated not only greater vision but better performance as well (Langer, Djikic,

Pirson, Madenci, & Donohue, 2010). Two years later, they had participants read text from one of Dr. Ellen Langer's books with the font for either 'a' or 'e' slightly reduced, compared to a control group with unaltered font. The experimental group demonstrated increased visual acuity across 3 separate experiments and further entrenched Dr. Ellen Langer's idea that we can physiologically adapt based on our mindset.

Extending this phenomenon, Dr. Ellen Langer also proved the power of mindset and creative mindfulness within the context of exercise and heart rate control. In one study, 84 female cleaning attendants across seven different hotels participated in a study examining belief about healthy exercise and its subsequent effects on physiology. Those in the experimental condition were told that their cleaning duties coincided with the Surgeon General's recommendations for healthy, active living. Examples of how their work could be construed as exercise were provided to help illustrate the idea. Those in the control condition did not receive this information. Despite no change in behavior after 4 weeks in the study, the informed group experienced a decrease in weight, blood pressure, body fat, hip-to-waist ratio and body mass index relative to the control group, suggesting the powerful effect a mindful mindset and perception can have on a person's physical health (Crum & Langer, 2007).

Another study assessed paying attention to fluctuations in heart rate (HR) on the capacity to control HR. Of the 43 participants, those who focused on the perceived stability of heart rate performed worse and exhibited no signs of control over their HR. Conversely, those who paid attention to the fluctuating nature of HR were able to show changes (increases) in their heart rate suggesting that control over one's physiology is in

part mediated by perception and mindful attention (Delizonna, Williams, & Langer, 2009). Dr. Ellen Langer and colleagues concluded that this study showcased the powerful effect of mindfulness on physiology, acting as a conduit for both emotional and physical health as well as proving Dr. Ellen Langer's assertion that novelty distinction is a key component in mindfulness as she defines it. The study also supports the possibility of a link between western mindfulness and self-regulation in general.

While not as extensively studied as more eastern influenced mindfulness interventions, there is still a range of benefits associated with western mindfulness as conceptualized by Dr. Ellen Langer and her colleagues. These include improved learning skills, creativity, concentration and performance on cognitive tasks as well as decreased burnout, stress and depressive symptomatology (Burpee & Langer, 2005; Carson & Langer, 2006; Delizonna, Williams, & Langer, 2009; Djikic et al., 2008; Haas & Langer, 2014; Langer, Russel, & Eisenkraft, 2009; Littman-Ovadia, Zilcha-Mano, & Langer, 2014; Pirson, Ie, & Langer, 2012). She embellished a facet of mindfulness as originally conceived by eastern philosophies, to create a new lens through which we understand the concept and the world around us. Her radical departure from purely meditative practices differentiated her work but further entrenched mindfulness as a fundamental tool in psychological health across a variety of domains with a multitude of beneficial effects.

Carson and Langer (2006) extend this concept by suggesting that western mindfulness aims to increase cognitive and behavioral control, developing an ability to endure uncertainty and mitigate reactivity while creating a more malleable and meaningful interaction with the surrounding context. This idea closely resembles the



central tenet of regulating attention which is mindful control and deliberate focus of attention on a goal or task (Fan, Mccandliss, Fossella, Flombaum, & Posner, 2005; Hart et al., 2013; Jha, Krompinger, & Baime, 2007). Western mindfulness interventions and self-regulation of attention have not been specifically studied together, yet the attention to novelty emphasized by Langerian mindfulness in concept highlights an inherent aspect of self-regulation necessary to notice unique aspects of everyday experiences.

### **Eastern Influenced Mindfulness Interventions**

There are many interventions influenced by the eastern style of mindfulness but the two most prominent are Mindfulness Based Cognitive Therapy (MBCT) and Mindfulness Based Stress Reduction (MBSR) (Gu, Strauss, Bond, & Cavanagh, 2015). While MBCT is mainly concerned with treating cognition through Cognitive-Behavioral Therapy (CBT), MBSR is the primary example of an eastern mindfulness intervention employing meditative practices and encompassing the main tenets of mindfulness as originally conceived of in eastern cultures (Gu et al., 2015). Thus, these interventions and others will be described in the following section, along with their relation to self-regulation of attention.

MBSR is an intensive structured clinical program aimed at fostering health and mitigating pain associated with physical and psychological disorders through various meditation based techniques that enhance present-minded awareness. It was developed by Dr. Jon Kabat-Zinn and colleagues at the University of Massachusetts in 1979 in an effort to apply eastern Buddhist conceptualizations of mindfulness into a clinical context and it

was initially conceived as an adjunct therapy for chronic pain (Bishop, 2002; Grossman, Niemann, Schmidt, & Walach, 2004).

MBSR typically runs for 8-10 weeks and incorporates both group exercises and individual homework assignments, for continued independent practice at home, with weekly sessions running at 2.5 hrs. with an additional full day class. Classes center around teaching mindfulness-based practices such as yoga, breathing techniques and postures for adaptive functioning during stressful or social situations. The program typically involves various practices aimed at fostering and developing awareness through psycho-educational in-class sessions and homework assignments that serve to extend and extend the skills learned through the program and adapt them to their own lives (Bishop, 2002). For example, the body scan is employed during sessions which involves systematically focusing attention on the breath and subsequently moving down each body part and, observing the physical sensations and relaxing the body, one part at a time. MBSR is a combination of mindfulness meditation and hatha yoga which is gentle posturing designed to develop muscle-skeletal flexibility. Participants are encouraged to practice 45 minutes each day individually (Praissman, 2008).

MBSR has shown to be effective in a wide range of populations, with both clinical and non-clinical people experiencing the health promoting benefits of this relatively inexpensive therapeutic program (Grossman et al., 2004; Alberto Chiesa & Serretti, 2009). Significant reductions in subjective pain experience has been reported (Kabat-Zinn, Lipworth, & Burney, 1985) with numerous populations, including cancer patients (Witek-Janusek et al., 2008) and HIV-positive patients (Gayner et al., 2012).

MBSR has even been shown to enhance sleep for cancer patients (Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003). Studies with clinical populations suggest MBSR can reduce symptoms of depression, dysphoria, and rumination (Anderson, Lau, Segal, & Bishop, 2007) anxiety, anger and hostility (Anderson et al., 2007; Baer, 2003; Carmody & Baer, 2008), and stress, including symptoms of Post-Traumatic Stress Disorder (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010). Many of these effects were associated with duration of meditative practice (Baer, 2003). Perhaps the true clinical utility of MBSR lies in its ability to not only reduce negative symptomatology, but also to enhance the quality of life for patients and improve psychological well-being for most who take the program (Witek-Janusek et al., 2008). Subjective self-report of psychological state, including emotions and existential schemas like hope and forgiveness, often improve after engaging in MBSR (Chang et al., 2004; Shapiro, Brown, Thoresen, & Plante, 2011). In addition, self-regulation improves with regards to behavior and emotions (Robins, Keng, Ekblad, & Brantley, 2012) and a sense of coherence (Weissbecker et al., 2002) along with metacognitive awareness (Shapiro et al., 2006).

Other forms of mindfulness based interventions include Mindfulness Based Cognitive Therapy (MBCT), and Dialectical Behavioral Therapy (DBT). MBCT was developed by Zindel Segal, Mark Williams, and Jon Teasdale and models the MBSR protocol and 8-week timeline (Segal, 2002). It was originally designed to treat depressive relapse in patients with a history of chronic depression through a combination of mindfulness skills training and cognitive-behavioral therapy which aims to address key psychological mechanisms such as ruminative thinking (Coffey et al., 2010). A meta-

analysis in 2016 revealed that MBCT was effective in relapse prevention for patients with recurrent depression, even after the 2 months follow up period (Kuyken et al., 2016). DBT is a form of CBT originally designed to help suicidal patients with Borderline Personality Disorder (BPD), but shown to be effective in various clinical populations with skills related to emotional regulation, social skills training, anger management and depression (Valentine, Bankoff, Poulin, Reidler, & Pantalone, 2015). DBT typically addresses 4 core features of BPD: attentional control (using mindfulness skills training); emotional regulation; interpersonal skills; and distress tolerance (Coffey et al., 2010).

The ultimate goal of this intervention is to change the symbiotic relationship between thought and mind. A healthier psychological framework that is aware of the inherent bi-directional relationship between mind and body is the ultimate goal. Thoughts can affect us and in turn we too can be more agentic and less automatic, more proactive and less reactive in relation to our thoughts. There is a special emphasis on the maladaptive thinking patterns which sustain vicious cycles of self-defeating psychological schemas (Bishop, 2004; Fjorback et al., 2011; Kabat-Zinn, 2003; Shapiro et al., 2006).

The essence of mindfulness meditation practices seek to cultivate present-moment awareness and insight through a regulation of attention to one's physical sensations, thoughts, feelings and behaviors (Didonna, 2009). This attentional control and regulation has featured prominently in most models of eastern mindfulness and form the foundational nature of clinical interventions such as MBSR (Anderson, Lau, Segal, & Bishop, 2007; Ruth A. Baer, Carmody, & Hunsinger, 2012; Malinowski, 2013; van

Dillen & Papies, 2015). The techniques of MBSR, such as the body scan and meditation, involve regulating one's attention to physiological sensations and processes like the breath are used as training techniques to cultivate this mindful mode in everyday life (Chiesa & Malinowski, 2011).

### **Present Study**

Hart et al. (2013) did a review of 8 decades of research on two leading views on mindfulness (Langer and Kabat-Zinn and their colleagues) which has been running in parallel for years. They present a comprehensive comparison of both eastern and western mindfulness, citing numerous differences in conception, methodology, measurement, theoretical orientation and clinical interventions. As discussed, eastern mindfulness borrows from Buddhist philosophies which emphasize physiological sensations and awareness of internal and external stimuli while Dr. Ellen Langer's model is viewed as its western, cognitive oriented counterpart that places importance on creative application of mindfulness outside of purely meditative practices. Their conceptual focus differs as well in that eastern mindfulness is more wide-ranging and comprises mental and physical aspects of experience. Kabat-Zinn's definition thus indicates that mindfulness involves (a) self-regulation of one's awareness, (b) directing one's attention to internal and external stimuli, (c) introspection and metacognitive awareness of one's thoughts processes, and (d) adopting a nonjudgmental attitude (Bishop et al., 2004) while Dr. Ellen Langer's model focuses on promoting novelty and engagement in the mind exclusively. The scales used to measure these two constructs, namely the FFMQ and the LMS, reflect

this conceptual difference in that Langerian mindfulness seems to overlap with the openness dimension of eastern mindfulness which includes many more aspects in its comprehensive theoretical framework. Eastern mindfulness has been utilized in more structured therapeutic interventions promoting meditative practices with clinical populations while Langerian mindfulness promotes mindful modes of cognition through brief, instructional interventions that are typically researched in a non-clinical context (Hart et al., 2013).

Despite these differences, Hart et al. (2013) contend that the central mechanism shared by both eastern and western styles of mindfulness (as primarily associated with Dr. Jon Kabat-Zinn and Dr. Ellen Langer respectively) is self-regulation of attention. However, to the best of this author's knowledge, this has never been empirically investigated.

The present thesis will investigate and test the claim that self-regulation of attention is a common mechanism of eastern and western mindfulness and be the first to test it empirically. To do so, meditators and non-meditators were required to complete self-report questionnaires on eastern and western mindfulness as well as on self-regulation of attention.

The main hypothesis is that 1) self-regulation of attention does mediate the relationship between western and eastern mindfulness. In other words, the capacity for self-regulation of attention would explain the relation between the two type of dispositional mindfulness. To find this, the mediator (self-regulation), the DV (western mindfulness) and the IV (eastern mindfulness) must be all significantly correlated. The

secondary hypothesis are 2) Eastern and western mindfulness are positively correlated to some degree. In other words, as dispositional western (or creative) mindfulness is high so would tend to be the dispositional eastern (meditative) mindfulness. 3) Western mindfulness is correlated with self-regulation of attention. Self-regulation of attention tends to be high when dispositional western mindfulness is high. Finally 4) Eastern mindfulness is correlated with self-regulation of attention. Self-regulation of attention tends to be high when dispositional eastern mindfulness is high. The significant mediation will be established using the regression- based methods described by Baron and Kenny (1986) and the Sobel-Goodman analyses (Sobel, 1982; Goodman, 1960). This will be the first study to examine whether self-regulation of attention does mediate eastern and western styles of mindfulness.

## **Methods**

### **Measures**

***FFMQ.*** The FFMQ scale is a 39-item comprehensive mindfulness scale based on Eastern Mindfulness, and it measures five facets of the construct; observing, describing, acting with awareness, nonjudgment of inner experience, non-reactivity to experience. The FFMQ was derived from confirmatory factor analyses of previous scales measuring Eastern mindfulness, described in further detail in the previous section. Item response categories range from 1 'Never or very rarely true' to 5 'Very often or always true'.

***LMS.*** The LMS is a 21-item Likert scale based on Western mindfulness, and it includes the following subscales: flexibility, novelty producing, novelty seeking, engagement. Item response categories from 1 'strongly disagree' to 7 'strongly agree'.

**SRS.** The SRS is a 10-item scale designed to measure self-regulation capabilities; specifically, self-regulation of attention in the pursuit of a goal. Item response categories range from 1 'not all true' to 4 'completely true'. The coefficient of internal consistency (Cronbach's  $\alpha$ ) was .76.

**Socio-demographic questionnaire.** Questions regarding the participant's age, sex, education, meditation experience and other related questions were asked before the main scales were presented. Please Table 1 for more information.

### **Participants and Recruitment**

The study was approved by the Research Ethics Board (REB) at Laurentian University. Participants were recruited using three methods: 1) through undergraduate university classes, 2) with snowball sampling technique, and 3) through online advertising. This was done to maximize recruitment and establish a streamlined, efficient process that made it as easy as possible for participants to submit their answers. It also allowed for the recruitment of a variety of participants in terms of age, meditation experience, etc. The first method was in class student recruitment, where undergraduates were offered the chance to participate in this research in exchange for bonus marks in academic courses. The second involved the snowball technique which functions like chain referral. Participants were asked to pass a survey along to family and friends who might be interested in mindfulness. The third method involved sending the invitation to various mindfulness centers where several managers were contacted and requesting that they share the survey to interested clients and parties. The third involved the snowball technique which acts like chain referral. Participants were asked to pass a survey along to



family and friends who might be interested in mindfulness and those who completed the survey were also given an option to be entered into a draw for a \$50 Amazon gift card by sharing the survey link over social media in exchange for points which would determine a winner based on the greatest number of shares. This included Laurentian University in the greater Sudbury community and other citizens of different avenues based on how the survey was shared through the snowball technique employed.

In total, 261 participants were recruited; 208 of these participants answered all the questions and were included in the analysis. Amongst the participants, 176 identified themselves as females (33 males). The mean age was 23.84 (SD = 10.20). 154 people reported no meditation experience with 55 people reporting previous meditation experience of some kind (yoga, sitting meditation, etc.). Additional demographic information can be seen in Table 1.

**Table 1**  
***Demographic Characteristics***

Variable	<i>n</i>	%
Gender		
Female	176	84.21
Male	33	15.79
Age		
17-26	167	80.29
27-36	19	9.13
37-46	9	4.33
47-56	3	1.44
57-77	8	3.85
Education		
Primary school	1	0.48
High school	160	76.55
Professional degree	19	9.09
Bachelors degree	18	8.61
Graduate degree	11	5.27
Employment Status		
A student	167	79.90
Employed	32	15.31
Other	10	4.79
Meditation Experience		
No	154	73.68
Yes	55	26.32
Meditation Frequency		
Rarely	5	2.40
Once in a while	22	10.58
Once a week	4	1.92
Few times a week	16	7.69
Everyday	7	3.37
Meditation Duration		
A few weeks	4	1.92
A few months	7	3.37
A year	15	7.21
A number of years	22	10.58
A decade	3	1.44
A number of decades	3	1.44

*Note.* Due to rounding errors, percentages may not equal 100%.

## **Procedure**

All participants completed the survey through the redcap system which is an online survey creation website that is commonly used in university research. First, participants read a notification statement or informed consent document that explained the risks and benefits of participating and emphasized their rights to skip any answer or withdraw from the study at any time. They provided consent to participate by clicking “Next” in the survey and reported demographic information consisting of age, gender, education, marital status and employment. Additionally, questions asking about meditation experience were presented, asking about type, duration and reasons for practice. The three main scales of the FFMQ, LMS, and SRS were presented next and concluded the survey process. The entire survey required approximately 1 hour to complete.

## **Data Analysis**

Internal consistency of each scale was assessed with Cronbach’s alpha while Pearson Correlation Coefficients were computed between scales. The Baron and Kenny mediation analysis (Baron & Kenny, 1986) and the Sobel-Goodman mediation analysis (Goodman, 1960) were used to examine any possible indirect effect of self-regulation of attention, as measured by the SRS scale, between the LMS and the FFMQ. The analysis was conducted using the Intellectus Statistics software for the Baron and Kenny Mediation analysis and the sgmediation command of the STATA version 12.1 (College Station, Texas) was used to conduct the Sobel-Goodman mediation analysis.



## Results

The Table 2 presents the summary statistics (mean, standard deviations, standard error) and the normality of the FFMQ, the LMS, and the SRS. Normality of the distribution was tested with skewness, kurtosis, and the Shapiro-Wilk tests. No variables violated the parameters for skewness and kurtosis. According to the Shapiro-Wilk tests only the FFMQ significantly differed from normality (see Table 2).

**Table 2**

*Summary Statistics and the normality of the FFMQ, LMS and the SRS*

Variable	<i>M</i>	<i>SD</i>	<i>SEM</i>	Skewness	Kurtosis	<i>W</i>
FFMQ	122.31	17.93	1.24	0.21	1.01	0.98*
LMS	107.40	14.12	0.98	0.01	-0.26	1.00
SRS	27.28	5.16	0.36	-0.03	-0.20	0.99

**Note.** FFMQ: Five-Facet Mindfulness Questionnaire; LMS: Langer Mindfulness Scale; SRS: Self-Regulation Scale ; W: Shapiro-Wilk test

**Note.** When the skewness is greater than or equal to 2 or less than or equal to -2, then the variable is considered to be asymmetrical about its mean. When the kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers. The asterix (\*) indicates that p-value was significant at .05.

### Internal Consistency and Correlations Between Scales

Table 3 presents the Cronbach alpha coefficients for the FFMQ, LMS and SRS. The internal consistency is very good for the FFMQ, and good for the LMS and the SRS. In the FFMQ, the coefficient alpha of the total score is 0.90 indicating a very internal consistency. In the LMS, the total score has an alpha of .85 indicating good internal consistency. The items for SRS had a coefficient alpha of 0.85, indicating good internal consistency.

**Table 3**

*Coefficient Alpha for the FFMQ, LMS, and SRS*

Scale	No. of Items	$\alpha$
FFMQ	39	0.90
LMS	21	0.85
SRS	10	0.85

Pearson correlations between the measures of mindfulness and self-regulation of attention (FFMQ, LMS and SRS) are presented in Table 4. There was a significant positive correlation between FFMQ and LMS ( $r_p = 0.52, p < .001$ ) with a medium effect size ( $R^2 = .27$ ). This shows that as FFMQ score increases, LMS score tends to increase. There was also significant positive correlation between FFMQ and SRS ( $r_p = 0.66, p < .001$ ) with a medium effect size ( $R^2 = .44$ ). This indicates that as FFMQ score increases, SRS score tends to increase. Additionally, there was a significant positive correlation between LMS and SRS ( $r_p = 0.45, p < .001$ ). The effect size for the LMS and SRS was small ( $R^2 = .20$ ). This indicates that as LMS score increases, SRS score tends to increase.

**Table 4***Pearson Correlation among FFMQ, LMS, and SRS*

Variable	1	2	3
1. FFMQ	-		
2. LMS	0.52	-	
3. SRS	0.66	0.45	-

*Note. Correlations are significant at  $p < 0.001$ .***Mediation Analysis**

To test whether self-regulation of attention mediates the relationship between eastern and western mindfulness, we used the Baron and Kenny method followed by the Sobel-Goodman test to confirm our results. According to Baron and Kenny, to determine whether a mediating relationship was supported by the data, three regressions are required. For mediation to be supported, four items must be met: 1) the independent variable must be related the dependent variable, 2) the independent variable must be related to the mediator variable, 3) the mediator must be related to the dependent variable while in the presence of the independent variable, and 4) the independent variable should no longer be a significant predictor of the dependent variable in the presence of the mediator variable (Baron & Kenny, 1986). In this analysis, the independent variable is LMS, the mediator is SRS and the dependent variable is FFMQ. The mediation results found within the Baron and Kenny method are presented in Table 5.

To evaluate the mediation of the relationship between the LMS and FFMQ by SRS scores the steps recommended by Baron and Kenney (1986) were followed. First, the LMS score (IV) is shown to predict the FFMQ score (DV) ( $B = 0.66$ ,  $p < .001$ ). Second, the LMS score is shown to predict the SRS score (MV) ( $B = 0.16$ ,  $p < .001$ ) For the third criteria, a regression of FFMQ using LMS and SRS is shown to fit the data,  $F(3, 205) = 101.03$ ,  $p < .001$ ) suggesting that the LMS and SRS account for a significant amount of variance in the FFMQ. However, the LMS score remains a significant

predictor of FFMQ when SRS was included in the model, ( $B = 0.35$   $p < .001$ ) indicating that the fourth criterion for mediation was not completely satisfied. Since items 1, 2, and 3 were met, while item 4 was not, partial mediation is supported. A Sobel-Goodman mediation analysis, considered more conservative, replicated these results ( $Z = 5.76$ ,  $p < .0001$ ), and estimated that the SRS explained about 46% of the correlation between the FFMQ and the LMS.

**Table 5**

*Regression Results with SRS Mediating the Relationship Between FFMQ and LMS*

Dependent	Independent	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Regression 1:					
FFMQ	LMS	0.66	0.08	8.70	< .001
Regression 2:					
SRS	LMS	0.16	0.02	7.24	< .001
Regression 3:					
FFMQ	LMS	0.35	0.07	5.00	< .001
	SRS	1.86	0.19	9.62	< .001

## Discussion

This study investigated the empirical relationship between the FFMQ and the LMS as a way of exploring the relationship between the eastern and western styles of mindfulness. We examined the claim of Hart, Itzvan & Hart (2013), that self-regulation of attention mediates the relationship between eastern and western modes of mindfulness. The literature on mindfulness has been dominated by these two schools of thought over



the past several decades. According to Hart and colleagues, self-regulation of attention was proposed to be the common mechanism underlying both eastern and western mindfulness interventions.

To the best of this author's knowledge, this study is the first to test and empirically validate the claim that self-regulation of attention mediates the relationship between eastern and western styles of mindfulness. For a mediation effect to occur, significant correlations have to be found between eastern mindfulness, western mindfulness, and self-regulation of attention. All four of our main hypotheses were supported, specifically that 1) self-regulation of attention does mediate the relationship between western and eastern mindfulness. In other words, the ability to regulate attention would explain the relationship between the two types of dispositional mindfulness. To find this, the mediator (self-regulation), the DV (western mindfulness) and the IV (eastern mindfulness) must be all significantly correlated. 2) Eastern and western mindfulness are positively correlated to some degree. As dispositional western (or creative) mindfulness increases, so does dispositional meditative mindfulness. 3) Western mindfulness is correlated with self-regulation of attention. Self-regulation of attention tends to be higher when dispositional western mindfulness is high. Finally 4) Eastern mindfulness is correlated with self-regulation of attention. Self-regulation of attention tends to be higher when dispositional eastern mindfulness is high.

These results suggest that eastern and western mindfulness are not exactly the same but that they related. They have a relatively strong correlation (0.52) considering their internal consistency. Thus, the higher the disposition of eastern mindfulness, the

higher the disposition of western mindfulness tends to be in an individual. Our findings show a stronger correlation than was found in other studies. Siegling & Petrides (2014; 2016) found a relatively weak correlation (0.00-0.36). A comparable confidence interval for the present study is (.40 - .64); these almost overlap. The difference could also be explained by any of several differences between these earlier studies and the present study. Firstly, their procedure was different with an extensive list of questionnaires given to participants, including several mindfulness scales and a personality measure; this may have caused fatigue in participants, increased noise in the data, and possibly reduced the correlation. Furthermore, their sample included people with more eastern backgrounds, and they may have had a natural inclination towards the eastern mindfulness scales. In addition, 25% of our participants had some experience in mindfulness and meditation (which was not measured in the previous study). It is possible our sample contained participants with more or less meditation experience which could have influenced results. Lastly, the study was conducted at a British university and natural inherent diversities between their culture and a Canadian campus could have affected the results. Nevertheless, our results indicate a correlation between eastern and western mindfulness not yet seen in the literature.

As far as the present author knows, no one has previously investigated the involvement of self-regulation in western mindfulness. The present study found a moderate correlation between them. The correlation indicates that the people who are high in dispositional western mindfulness tend to be high in self-regulation of attention. Given the significant role of novelty and the adoption of multiple perspectives, coupled

with the opposition to mindlessness, it makes sense that attentional control would play a central role in Dr. Ellen Langer's mindfulness. One possibility is that having better attentional control would help to refrain from the frequent use of automatisms associated with mindlessness and rather facilitate multiple perspectives taking. Another study assessed paying attention to fluctuations in heart rate (HR) on the capacity to control HR. Of the 43 participants, those who focused on the perceived stability of heart rate performed worse and exhibited no signs of control over their HR. Conversely, those who paid attention to the fluctuating nature of HR were able to show changes (increases) in their heart rate suggesting that control over one's physiology is in part mediated by perception and mindful attention (Delizonna, Williams, & Langer, 2009). The authors concluded that this study showcased the powerful effect of mindfulness on physiology, acting as a conduit for both emotional and physical health as well as proving Dr. Ellen Langer's assertion that novelty distinction is a key component in mindfulness as she defines it. Another study highlighted the effects of focusing attention on variability, and thus novelty, by creating mindfulness attention training programs that encouraged pregnant women to record the changing nature of their positive and negative physiological sensations in a diary. This group was compared to two control groups who did not engage in this task. The study found that trait mindfulness, as measured by the LMS, after engaging in the task designed to elicit attention to novel fluctuations in physiological sensations predicted greater health in the expecting mothers. These results further supported the notion that drawing attention to novelty and becoming mindful of the surrounding context form a relationship that predicts healthier outcomes as compared

to automatic cognitive processing (Zilcha-Mano & Langer, 2016). Western mindfulness is often conceptualized within educational contexts and as a medium of creativity, encouraging people to develop new categories through deliberate engagement. Taken together with the previously mentioned studies, it supports the earlier assertion that novelty seeking involves an inherent and deliberate regulation of attention to detail and context which embellishes the construct of western mindfulness. It is very difficult, if not impossible, to unconsciously become mindful of the external world to any useful degree through automatic and habitual cognitive processing. This could have important implications for various contexts such as how we educate children in schools, possible training for patients in hospitals, and our general engagement with the world around us. The present finding of this study warrants further investigation into the central mechanisms of western mindfulness and exactly how it exerts its effects.

The present study supports the claim that self-regulation of attention is correlated in eastern mindfulness. The moderate correlation indicates that people who are high in dispositional eastern mindfulness tend to also be high in self-regulation of attention. This finding is unsurprising given the vast literature on self-regulation and mindfulness. Meditation is often conceptualized as a complex interplay between several regulatory capacities pertaining to attention and emotion (Lutz, Slagter, Dunne, & Davidson, 2008). A moderate to strong correlation has been found between eastern mindfulness and a general measure of self-regulation, the SCS (Bowlin & Baer, 2012). It's a general construct of self-regulation addressing aspects such as emotional and behavioral self-regulation. In this study, a sample of 280 undergraduate students completed self-report

measures and a correlation was found between the subscales of the FFMQ and the total score of the SCS (0.31 – 0.55) (Bowlin & Baer, 2012). Our study replicated their findings but extended the results in two ways – using a specific test of self-regulation of attention and including the LMS. Regulating one's attention is considered to be a core mechanism of different forms of self-regulation due to more efficient attentional resource allocation. Studies have shown that attentional improvements resulting from mindfulness meditation include more efficient early stage perceptual processes, and consequently more efficient allocation of attentional resources; possibly across sensory modalities (Moore, Gruber, Deroose, & Malinowski, 2012). The correlation between the FFMQ and the SRS suggests a possible specific relationship with attentional regulation and mindfulness, as opposed to a general self-regulation effect.

Regression analyses and Sobel-Goodman analysis found that the relation between western mindfulness and eastern mindfulness is partially mediated by self-regulation of attention. This finding supports the claim that eastern and western mindfulness are not identical but that they have self-regulation of attention as a common mechanism. The tendency to find people who have high disposition western mindfulness to be also high in dispositional eastern mindfulness is partly linked to peoples reported self-regulation of their attention. These findings suggest that Hart et al. (2013) were correct in their assumption that self-regulation of attention is actually capturing most of what both eastern and western mindfulness have in common. However, considering that the mediation is partial, there may be other common elements between these two kinds of mindfulness. As mentioned by Hart (2013): there are, some key differences between them

in their underlying philosophies, the components of their constructs, and their foci. This suggests that the two models embody different qualities of mindfulness, with Dr. Ellen Langer's construct emphasizing the effortful, deliberate awareness to external events, and the inventive components that underlie creativity, while Kabat-Zinn's model stresses the metacognitive processes involved, the accepting and nonjudgemental stance, and also incorporates the means to induce and habituate these cognitive processes.

Given the findings, this research presents the first evidence of the effect of self-regulation of attention on mindfulness in general. This would suggest that the style of mindfulness, eastern or western, may not matter if attentional control is the core mechanism. This is not to say that each style of mindfulness does not offer something unique, but training in attentional control may offer some of the benefits of mindfulness to the practitioner on its own, without the addition of learning other aspects of western or eastern mindfulness.

The findings of this study may have future implications for clinical interventions employing mindfulness. If the goals of an intervention involve an increase in mindfulness, it may be possible to utilize self-regulation of attention as an intentional aspect of the training. An increase in both eastern and western mindfulness should occur based on the finding that self-regulation of attention mediates the relationship between eastern and western mindfulness. Training in attentional regulation could serve as a vehicle to enhance western mindfulness and novelty seeking.

There were several unique aspects of our study which included a large population of both young university students and older people who have significant experience with

mindfulness training. Many other studies have included one or the other and the large variety in our sample provided more breadth, further strengthening our results. The online format of our survey allowed people to complete the scales at their own pace, with complete anonymity; this likely contributed the large sample size we procured from recruitment. Furthermore, this study was the first in the literature to utilize the FFMQ, LMS, and SRS together to investigate the role of attention in both eastern and western styles of mindfulness.

There are some limitations which need to be acknowledged. One such limitation of this study could be that the LMS is not as psychometrically strong as the other two measures used in this study. There are no alternatives as the LMS was designed and tested by Dr. Ellen Langer and colleagues who pioneered the development of the scale to measure her conceptualization of mindfulness. She remains the sole authority on the model, so we were limited to the use of this one scale in measuring western mindfulness; this could have influenced our analyses by overestimating or underestimating the true underlying effects. Additionally, the FFMQ differed significantly from normality, as shown by the Shapiro-Wilk test, and this may have caused some overestimation of the beta coefficients. Thus, the results should be interpreted with caution. Furthermore, the potential bias in self-report scales is well-known and may have influenced participant's responses who may have selected choices that reflect more positive aspects of their self-perception. Additionally, this was a Canadian study, and the findings may not be generalizable to other cultures and contexts. Other studies should attempt to replicate findings across different populations and cultural contexts.

Further research could extend these findings and investigate and compare self-regulation of attention within two different groups practicing eastern and western mindfulness. The inclusion of a comparison study utilizing both types of mindfulness may be informative with respect to clinical implications and extend their respective streams of research. The addition of a control group and randomization to a differential comparison study such as this would provide additional rigour, which is especially important given their proclivity as clinical interventions (Hart, Ivztan, & Hart, 2013).



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